

REMARKS

This is in response to the Official Action currently outstanding with respect to the above-identified application, which Official Action the Examiner has designated as being FINAL.

Claims 1-11 were present in this application as of the time of the issuance of the currently outstanding FINAL Official Action. By the foregoing Amendment, Claims 1-11 have been amended. No claims have been either added or canceled. Accordingly, in the event that the Examiner grants entry of the foregoing Amendment, Claims 1-11 as set forth above will constitute the claims under active prosecution in this application.

The Claims as they will stand in the event that the Examiner grants entry to this Amendment are set forth above as required by the Rules. Applicants respectfully submit that the claims set forth above are in condition for allowance (or at least in better form for appeal than heretofore), and that the present Amendment raises no new issue that would require further consideration and/or search in the event of its entry all as required by 37 CFR 1.116.

More specifically, it is noted that in the currently outstanding FINAL Official Action, the Examiner has:

1. Acknowledged Applicants' claim for foreign priority under 35 USC 119(a)-(d) or (f), and indicated that the required certified copies of the priority document have been received by the United States Patent and Trademark Office;

2. Acknowledged Applicants' last filed Information Disclosure Statement by providing Applicants with a copy of the Form PTO-1449 that accompanied that Information Disclosure Statement duly signed, dated and initialed by the Examiner to confirm his consideration of the art disclosed therein;
3. Objected to the drawings under 37 CFR 1.83(a) as not showing every feature specified in the claims and required Applicants to submit a proposed drawing change or corrected drawings in response to the currently outstanding Official Action;
4. Objected to certain of the claims on the basis that their phraseology justifies the use of the word "said" associated with certain elements deemed to have sufficient antecedent basis earlier in those claims and indicated that correction is therefore required; and to others of the claims on the basis that there is a difference between the element "source line driver" and "source driver" such that the term "source line driver" lacks appropriate antecedent basis in the claims;
5. Rejected Claims 1-11 under 35 USC 112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject matter that Applicants regard as their invention;
6. Rejected Claims 1-11 under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention; and

7. Rejected Claim 1-11 under 35 USC 103(a) as being unpatentable over the Kamei, et al reference in view of the Nitta, et al. reference (U.S. Patent 6,275,207 B1).

Further comment in these Remarks regarding items 1-2 above is not considered to be necessary in these Remarks.

With respect to item 4, Applicants by the foregoing amendment propose that the claims be amended (i) to reinsert the word "voltage" inadvertently omitted in the last Amendment at line 3 of Claims 3; (ii) to reinsert "gray scale" inadvertently omitted in the last Amendment at the next to last line of Claims 3, 4 and 10; and (iii) to make the technical phraseology changes suggested by the Examiner concerning elements having appropriate antecedent bases being preceded by the word "said" rather than an indefinite article or other phraseology. Please note that the indefinite article "a" was cancelled from Claims 3 and 4 by the previous amendment. Accordingly, Applicants propose hereinabove to delete the word "which" from claims 3-6 and 10, and to substitute the word -- said -- therefor.

Further, Applicants agree with the Examiner's observation that as defined in the present application the "source line drive circuit" 8 contains both a "**reference** gray scale voltage generator" and the "source driver" distinctly relative to one another. Therefore, Applicants are proposing amendments to the claims to correct any outstanding antecedent basis problems, and to conform the claims to the correct phraseology utilized in the originally filed specification and claims. In particular, the claims as hereinabove amended specifically clarify the fact that in the present invention the source line drive circuit (previously referred to in the claims of this application as the "source line driver") contains the source driver **and that in turn the source driver includes a grayscale voltage generator as an internal part thereof.**

It is respectfully submitted that in addition to the Examiner's foregoing requirement (as clarified by Applicants' just discussed claim phraseology amendment) concerning the correction of Applicants' utilization of the phraseology "source line driver" and "source driver", that that correction/clarification also is substantively significant in the differentiation of the present invention from the cited Kamei reference. In this regard, the Examiner's attention is respectfully directed to the Examiner's own characterization of the present specification in item 12 of the outstanding Official Action.

In particular, at that point in the currently outstanding Official Action, the Examiner unequivocally indicates the "source line driver" of this invention is different from the "source driver". In point of fact, as illustrated in Figs. 2 and 3 of the present application, the source line driver circuit 8 includes as distinct elements the source driver 2 and the grayscale **reference** voltage generation circuits 9. However, it is to be noted that in the present invention the source driver 2 includes as an internal part thereof the gray scale voltage generation circuit (which is to be distinguished from the grayscale **reference** voltage generation circuits 9 mentioned above). See, present specification at page 7.

In characterizing the Kamei reference at item 17 of the currently outstanding Official Action, on the other hand, the Examiner suggests that the source line driver (fig. 1) – meaning the source line driver circuit - therein discussed is to be read as comprising a source driver (elements 10 and 11, see, Kamei, et al at Column 3, lines 33-45) and a grayscale **reference** voltage generation circuits (see, element 4 and 5 discussed at the bottom of Column 2 of Kamei, et al., among other elements. Interestingly, those other elements include the voltage dividing resistor circuit mentioned at Column 2, line 64 of Kamei, et al referred to by the Examiner which circuit corresponds to the grayscale voltage generation circuit of the present specification.

Accordingly, it will be readily understood that even though the source line driver circuit in both the reference and the present invention include a source driver and a grayscale **reference** voltage generation circuit(s), the Examiner semantic attempt to attribute the structure of the present invention to the allegedly corresponding structure of the prior art is technically in error. Specifically, the Kamei et al reference makes it clear that elements 10 and 11 constitute the structures comparable to the structures referred to in the present specification as “source drivers”. Therefore, it also is clear in the Kamei et al reference that the grayscale voltage generation circuit (i.e., the voltage dividing resistor circuit **not the grayscale reference voltage generation circuits 4 and 5**) is not an internal part of either of the driver 10 or the driver 11.

Applicant heretofore has attempted to emphasize the very distinction emphasized by the Examiner between the “source line driver” and the “source driver” in support of its assertion that the present invention is neither anticipated, nor obvious, in view of the Kamei reference. Nevertheless, despite the Examiner’s own characterizations as noted above, the Examiner has continued his rejection of the present claims based upon a distorted reading of the Kamei reference. Hence, it must be recognized that in the Kamei, et al reference the source drivers are contemplated to be elements 10 and 11, and also that those elements in Kamei are to **receive** gradation voltages **from** the resistance-type voltage division circuit (gray scale voltage generation circuit) and to in turn output feed driving signals. This is directly contrary to the present invention wherein the **source driver** receives gray scale **reference** voltages and **internally** generates the gradation voltages. Applicants respectfully submit that the claims as hereinabove amended clearly and distinctly state this fact which was inherently present in the claims previously on file. Consequently, the above proposed amendment does not introduce any issue requiring further consideration and/or search into this application.

Applicants respectfully submit, therefore, that the Examiner's present rejections are untenable. The construction given to the terms of the claims under examination must be the same as the construction given to the structure of the prior art alleged to be the same as those elements of the claims. When this is done, it is undeniably clear that the Kamei, et al reference structure is **not** the same as, and does not teach or suggest, the present invention. Therefore, Applicants respectfully request reconsideration in response to this submission.

Similarly, the Examiner asserts that the Kamei reference renders the "resistance division ratios" discussed and claimed in the present specification obvious to a person of ordinary skill in the art. Interestingly, however, the Examiner also suggests that the term "resistance division ratio" is so unclear in the present specification as to render the specification non-enabling to a person of ordinary skill in the art (35 USC 112, first paragraph) and/or so unclear as to render the specification unsatisfactory from the point of view of a person of ordinary skill in the art being adequately able to determine what the claims do and do not cover (35 USC 112, second paragraph).

Applicants respectfully submit that the Examiner cannot have it both ways. If the specification is inadequate under 35 USC 112, the Examiner's combination of the Kamei and Nitta references to show the obviousness of the presently claimed resistance division ratios appears to be without basis. Stated slightly differently, the Examiner apparently had little problem understanding what Applicants' claimed "resistance division ratios" were intended to mean in rejecting the pending claims. Analogously, Applicants respectfully submit that a person of ordinary skill in the art also would not have any problem in understanding the resistance division ratio terminology used in this application in the context of an admittedly well known resistance-type voltage division circuit.

Turning now specifically to items 3, 5, and 6, the objection to the drawings and the rejections under 35 USC 112, the Examiner alleges that the following two passages found in the claims (i) are not shown in the drawings as filed, (ii) are indefinite for failing to particularly point out and distinctly claim the present invention (i.e., to determine what is and what is not covered by the claims), and (iii) are insufficient to enable one skilled in the art to make and/or use the invention:

Passage 1:

"positive-side (high level) voltage resistance division ratios and negative-side (low level) voltage resistance division ratios are set so as to be asymmetrical with one another depending upon level shift characteristics"

Passage 2:

"resistance division ratios are optimized depending upon gray scale characteristics"

even though that wording was changed by the last filed amendment to read:

"resistance division ratios of the resistance-type voltage division circuit are set to conform to the target gray scale display characteristics associated with said target gray scale levels".

Applicants respectfully disagree, respectfully again traverse the Examiner's objection to the drawings and rejections under 35 USC 112, and respectfully request reconsideration.

The Examiner's assertions that the foregoing passages are not clear and that they also do not enable one skilled in the art to make and/or use the invention, now are based upon the Examiner's suggestion that the specification does not provide an express definition of the positive-side and negative-side voltage resistance division ratios or the resistance division ratios of the resistance-type voltage division circuit. Further, the Examiner now suggests that the present specification does not explain how the positive-side (high level) voltage resistance division ratios and negative-side voltage resistance division ratios are set so as to be asymmetrical with one another depending on level shift characteristics or how the resistance division ratios are set to conform to the target gray scale characteristics associated with the target gray scale levels.

As examples of this, the Examiner in the previous Official Action indicated that the specification (i) does not contain the details of whether or not the series resistors are variable or fixed to predetermined values, (ii) specify what the relationship between the resistance values and the voltage resistance ratios are, and (iii) does not contain the details of how the resistance division ratios are optimized depending upon gray scale display characteristics. As mentioned, in the currently outstanding Official Action, the Examiner rephrases this rejection in terms of the Applicant failing to adequately **define** the terms used in the above-quoted passages.

The Examiner, however, still apparently has forgotten (or refused noticed) that the present specification clearly indicates that ***the various gray scale voltages generated by the source driver are to be set to conform to target gray scale display characteristics*** (i.e., characteristic relationships between an applied display signal input and the resulting display characteristics). Thus, the inputs are predefined for any particular case (i.e., the positive-side highest level gray scale reference voltage, the negative-side lowest gray scale reference voltage, and whatever intermediate gray scale reference voltages that may be desired) as are the target output characteristics. No one of ordinary skill in the art would expect it to be possible to specify all of the various specific voltage inputs and/or specific resistor values and/or specific resultant gray scale output voltages that might work satisfactorily in a particular combination thereof.

Instead, the present invention contemplates that the ***source driver*** is to contain a ***well-known*** resistance-type voltage division circuit that receives at least one positive side reference voltage input and at least one negative side voltage level input and evidences positive-side voltage resistance division ratios and the negative-side voltage resistance division ratios at the respective resistor junctions that are ***set respectively to correspond to a particular target gray scale characteristic*** so that an appropriate gray scale voltage may be selected corresponding to input display data to the pixels being driven. Consequently, the fact that the level shift ΔV is different for each gray scale level desired is reflected in the resistance division ratios of the resistance-type voltage division circuit set to generate the respectively desired gray scale voltage values at the respective intersections of the series connected resistors. Clearly, those skilled in the art are well aware of how to manipulate the values of the various resistors in the resistor-type voltage division circuit so as to achieve desired voltage outputs at each resistor intersection along the series connected resistors when at least the positive-side highest-level and the negative-side lowest-level gray scale voltages and the desired number and output qualities of the intermediate gray scale voltages are known.

Thus, in the examples discussed in the specification, the resistance ratios and the positive-side voltage resistance ratio at a particular selected one of the resistance junctions or a negative-side voltage resistance ratio at a particular selected one of the resistance junctions of the voltage division circuit **within the source driver (as defined separately from the source line driver)** are set to determine a gray scale voltage output corresponding to a particular one of the levels of a 64-level gray scale display that may be selected by the source driver according to the input data signal. The actual voltage and resistance values will vary depending upon the particular situation. It is to be understood, however, that both the positive-side voltage resistance ratio and the negative-side voltage resistance ratio at the respective resistance junctions in the resistance-type voltage division circuit are readily determinable and/or variable by those skilled in the art in each particular situation to achieve the desired voltage output at each intersection due to the assumed knowledge of the prior art (particularly that recited in the background portion of the present specification) by such individuals along with the teachings of the present specification.

Applicants know of no rule or holding that requires that the terms and/or phraseology used in the claims must be defined **per se** in the specification. What is required is that the specification must be such as to indicate that the Applicants were in possession of the invention at the time that they applied for patent protection and that the specification must be sufficient to enable a person of ordinary skill in the art to practice the invention without undue experimentation and also to be able to determine when his activity falls within the terms of the claims and when it does not. Further, the features of the claims must be shown in the drawings just as they must be fully discussed in the specification.

In this case, the specification (particularly at page 25, line 2 to page 27, line 6) could not be more clear and definite to a person of ordinary skill in the art. At that point in the specification it is noted that the gray scale voltage generation circuit 11 of the source driver 2 is a resistance-type voltage division circuit the components and operation of which the specification describes in detail. Specifically, at page 26, lines 15-18, it is stated that: "The positive-side second gray scale voltage V_{H2} generates at the intersection of resistors R_{H1} and R_{H2} **depending on the resistance division ratio of the resistance-type voltage division circuit.**" (Emphasis added) This sentence is followed by statements that clearly indicate that all of the voltages generated by the resistance-type voltage generation circuit are generated in the same way. Accordingly, Applicants respectfully submit that the meaning of "resistance division ratio" in the present application could not be more clear to a person skilled in the art, i.e., there is a potential difference between the positive-side highest level gray scale reference voltage applied to one end of the resistance-type voltage division circuit and the negative-side lowest-level gray scale reference voltage applied to the other end of the resistance-type voltage division circuit and the value of the gray scale reference voltage at any intersection between a pair of the series connected resistors of the resistance-type voltage division circuit is determined by the ratio of the resistances on the positive side of that intersection to the resistances on the negative side of that intersection (or vice versa).

Also in this case, Figure 4 (which is a graph showing positive-side gray scale voltage vs. resistance and negative-side gray scale voltage vs. resistance) by definition shows the positive-side voltage resistance division ratios and the negative-side voltage resistance division ratios for an exemplary case. It also clearly shows that the relationship of the positive-side voltage resistance ratios to the negative-side voltage resistance ratios is asymmetrical when the shift level characteristic is corrected as specifically described in the paragraph bridging pages 27 and 28 of the present specification. (See also, the second full paragraph of page 27 set forth above for minor typographical correction)

In this regard, the Examiner's attention is respectfully directed to the last sentence of the paragraph just mentioned that states: "As shown in FIG. 4, the resistance values of the series resistors for generating the positive-side gray scale voltages are set vertically asymmetrical with the resistance values of the series resistors for generating the negative-side gray scale voltages in consideration of the correction of the level shift ΔV characteristic." This ties directly with the first full paragraph of page 31 of the present specification that reads as follows:

"In the present embodiment, in consideration of the level shift ΔV on the gray scale voltage, the positive-side voltage resistance division ratios and the negative-side voltage resistance division ratios of the resistance-type voltage division circuit **inside the source driver** are set so as to be asymmetrical with one another. Therefore, voltages can be output in accordance with the level shift ΔV characteristic as indicated by the curves 21 and 22 shown in FIGS. 5 and 6. Furthermore, by the above-mentioned setting of the resistance division ratios, the source line drive circuit having the source driver in accordance with the present embodiment can generate gray scale voltages, **the center values of which have the characteristic indicated by the curve 32 of FIG. 13.** Therefore, the deviation of the correction of the level shift ΔV characteristic does not occur, thereby completely solving the display problem of flicker and the like." (Emphasis added)

Applicants consequently respectfully submit that the conclusion is inescapable that the voltage resistance division ratios referred to in the present specification are those representatively depicted in FIG. 4, and that no one skilled in the art could conclude otherwise.

Again, the lack of specific values or some sort of an equation defining these variables is not a justifiable basis for the Examiner's objection to the drawings and/or the specification as not showing the invention being claimed. Similarly, the optimum configuration (previously amended to adopt the perhaps less ambiguous "target gray scale" criteria) clearly is shown in numerous of the drawings, see for example, Figs. 3-6 and 12-13.

Accordingly, Applicants respectfully submit that they have disclosed and shown the elements of the present invention in the specification and drawings of this application in a clear, definite and appropriate manner. Applicants are entitled to assume that the person of ordinary skill in the art given the known gray scale levels desired in any particular context and the peculiarities of the display device involved will have little difficulty in setting the resistance values of the well known resistance-type voltage division circuit correctly, and otherwise will clearly understand and be able to make and/or use the invention in light of the specification and drawings currently on file. (Note again that should there be any question at all as to what the positive-side voltage resistance division ratio or the negative-side voltage resistance division ratio is, that question is fully answered in FIG. 4 and at pages 25-27 of the present specification.)

In addition, Applicants respectfully note in the above regards that there is generally an inverse relationship between the level of skill and knowledge in the art and the degree of specificity of disclosure required of the applicant. Thus, assuming that the meaning of the claim terminology is clear to those skilled in the art in view of the specification and their knowledge, the specification need not exhaustively define each term used nor meticulously describe each feature of the invention. (see, *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F2d 1367, 1379-1380, 231 USPQ 81, 90 (Fed. Cir. 1986))

The conclusion is clear. As long as the disclosure demonstrates that the Applicants were in possession of the invention at the time that the application was filed by the written disclosure or attached drawings and the invention is claimed in such a manner that those skilled in the art can reasonably understand what is and what is not covered by the claims, the requirements of 35 USC 112 are satisfied. Consequently, decisions withdrawing both the Examiner's outstanding objections to the drawings and the Examiner's rejections under 35 USC 112, first and second paragraphs, in response to this communication are respectfully requested.

With respect to the Examiner's rejections under 35 USC 103(a), Applicants respectfully submit that there can be absolutely no doubt that the claims of this application are neither anticipated by, nor obvious in view of, the Kamei, et al. and Nitta, et al references as asserted by the Examiner in the currently outstanding Official Action.

In the latter regard, the Examiner's attention is respectfully directed to Figs. 11-15b and pages 7-15 of the present specification respectively wherein prior art circuits having source drivers with internal resistance-type voltage division circuits that equally divide input gray scale reference voltages are described. The Kamei, et al type circuit **wherein a gray scale voltage generation circuit for supplying gray scale voltages to a source driver is provided outside of the source driver** also is described in the background section of this application.

Accordingly, Applicants already have made of record in this prosecution and discussed above the facts that in the Kamei, et al type resistance-type voltage division circuit is well known in the art, and that it is ***external of*** the source driver rather than being an ***internal*** part thereof. Further, Applicants also have made of record the facts that the resistance-type voltage division circuit of the Kamei reference becomes more and more impractical as the number of gray scale levels in the target gray scale characteristic increases. The reasons for this include size considerations, production cost, power consumption and resistor accuracy achievable with standard components.

In addition, even if resistor accuracy itself was not a severe problem, the formation of the Kamei, et al type circuit ***outside*** of the “source driver” suffers from increasing instability as the number of gray scale levels in the target gray scale characteristic increases. This is because of external factors such as noise from surrounding components that disrupts the small voltage gradations between the gray scale level voltages being generated for use in the output display.

The problems of the Kamei type circuit are avoided in the present invention, however, because the resistance-type voltage division circuitry located internally of the source driver is uniquely established so as to divide input reference voltages asymmetrically without the need to provide large scale voltage division components external to the source driver including the capability of providing alternating reference voltages to the mid-point of the division circuit. Instead, the present invention accomplishes all of the theoretical benefits of a Kamei et al type circuit internally of the source driver in a less complex, cheaper and smaller manner.

The Nitta, et al reference does not alter the foregoing even if the Examiner is correct in his derivation of resistance ratios from voltage ratios in the context of the Kamei et al circuit in view of the Nitta, et al disclosure. By this it is meant that the prior art teaches either that the source driver may contain a resistance-type voltage division capability wherein all of the resistors are equal to one another and such asymmetry as is present arises from asymmetry in the reference voltages provided to the internal resistance-type voltage division circuit; or a Kamei et al type circuit wherein an **external** resistance-type voltage division circuit is provided that supplies the desired gray scale voltages for each of the target gray scale levels to the source driver.

The former of these alternatives is inaccurate and the latter is impractical for gray scale characteristics having a large number of gray scale levels. Hence, the present invention, wherein the internal resistance-type voltage division circuitry is capable of providing all of the required gray scale voltage levels for the target gray scale characteristic with either no, or at least a smaller than otherwise, gray scale reference voltage generator represents a significant, unique and novel advance in the art.

Consequently, for each and all of the foregoing reasons, it is respectfully submitted (i) that the Examiner's analysis of the cited art is in error as he has applied it to the present claims, (ii) that upon reconsideration the Examiner will agree that his present rejections should be withdrawn for the reasons herein stated, and (iii) that the claims of this application as they will stand upon the entry of the foregoing Amendment are in condition for allowance, or at least in better form for Appeal. Reconsideration of this application and the allowance of Claims 1-11 of this application in response to this communication, therefore, are respectfully requested.

Finally, Applicants believe that additional fees are not required in connection with the consideration of this response to the currently outstanding Official Action. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge and/or credit Deposit Account No. **04-1105**, as necessary, for the correct payment of all fees which may be due in connection with the filing and consideration of this communication.

Respectfully submitted,

Date: November 18, 2003

By: David A. Tucker
David A. Tucker
Reg. No. 27,840
Attorney for Applicant(s)

EDWARDS & ANGELL, LLP
P.O. Box 9169
101 Federal Street
Boston, MA 02109
(617) 523-3400
330754v3